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CASE REPORT

Cough syncope induced by gastroesophageal reflux disease

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Summary A 52-year-old Japanese man was admitted to our hospital for evaluation of syncope and convulsions. An electrocardiogram on admission revealed normal sinus rhythm. However, after repeated bouts of coughing, the heart rate showed bradycardia associated with convulsion. He was diagnosed with cough syncope secondary to laryngopharyngitis, which was caused by gastroesophageal reflux disease (GERD). Once the patient was administrated lansoprazole (Takeda Pharmaceutical Co., Osaka, Japan) for GERD, the syncope disappeared. The causes of syncope are diverse and may manifest in disorders of different organ systems in the body. Therefore, clinicians should perform a careful whole body examination to obtain the correct diagnosis.

Introduction

Cases of syncope are encountered in the emergency room on a regular basis. We report on the case of a 52-year-old Japanese man who was admitted for evaluation of syncope and convulsions.

Case report

A 52-year-old Japanese man was admitted to our hospital for evaluation of syncope and convulsions. He reported experiencing repeated vomiting after a farewell party, and losing his consciousness and having convulsions immediately after a coughing spell a few days later. The patient also reported consuming around 700 ml of Japanese sake every day. He was admitted to the neurosurgical unit of our hospital. After admission, an electrocardiogram (ECG) monitor recording revealed a sinus pause every coughing spell. Hence, he was diagnosed as having Adams—Stokes attacks and referred for the evaluation of bradycardia.

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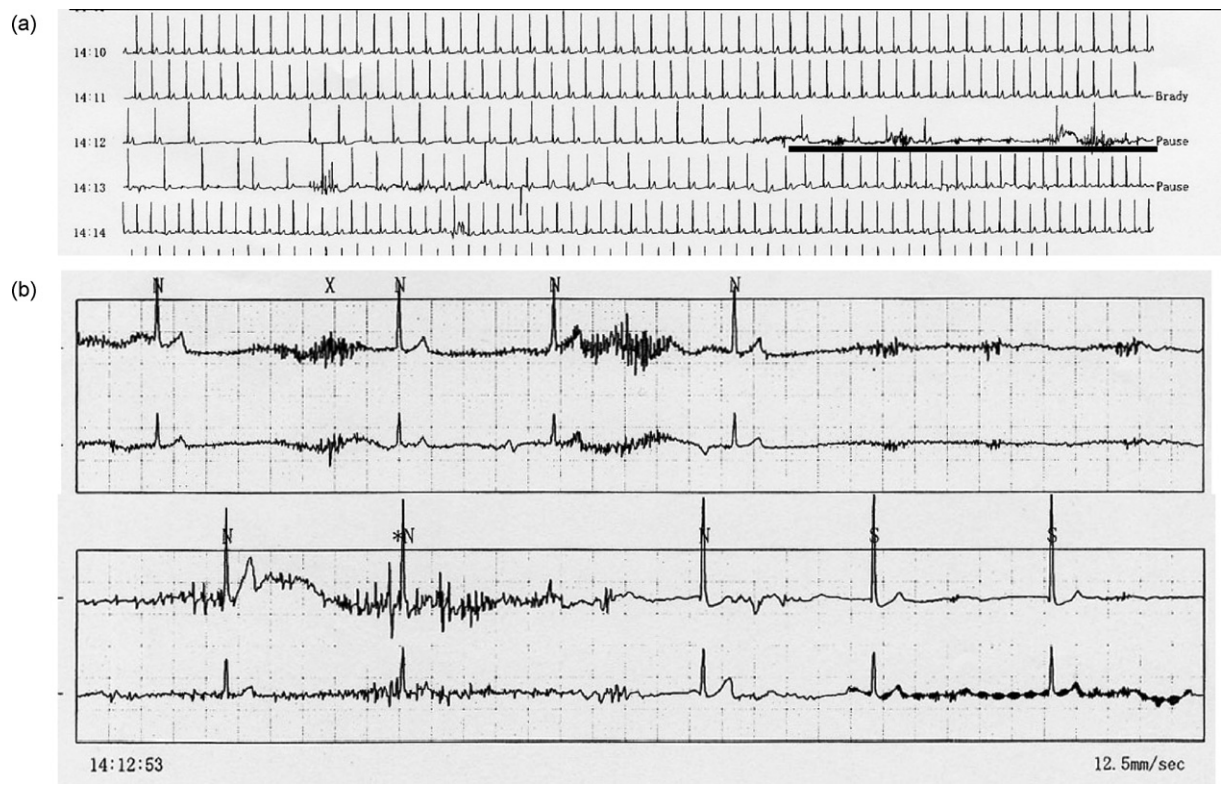

Figure 1 (a) Holter ECG during cough syncope attacks and (b) close-up of the part of long sinus pause.

His consciousness was clear on admission. He was 166 cm tall and weighed 64 kg. There was no evidence of obesity, thick neck, or abnormal findings in his oral cavity. His blood pressure and pulse rate were 86/64 mmHg and 64 beats/min, respectively. A physical examination revealed whistling rales in his throat (audible only immediately after persistent dry cough) and normal heart sounds.

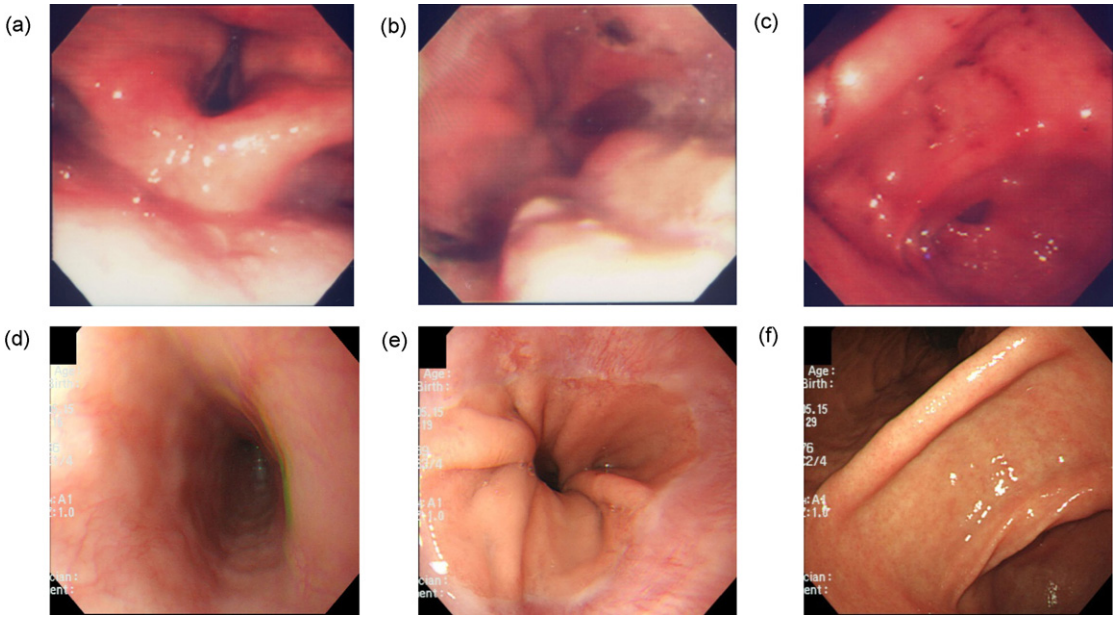

Figure 2 Gastrofiberscopy on admission. (a) Laryngitis and edematous mucosa; (b) esophageal ulcer and severe esophagitis; (c) acute gastric mucosal lesion (AGML); (d—f) follow-up gastrofiberscopy 20 days after admission; (d) healed esophageal ulcer and severe esophagitis; (e) persistent reflux esophagitis; and (f) AGML resolution.

No abnormal neurological findings were detected. Twelve-lead ECG and chest X-rays were normal. Transthoracic echocardiography did not detect any abnormality. A blood test showed above normal creatinine kinase (CK) levels, while CK-MB levels were within normal limits.

Holter ECG and ECG monitoring demonstrated a long sinus pause (maximum R—R interval of about 7.8 s) after a coughing spell (Fig. 1) in the intensive care unit. At about the same time, he experienced convulsions and loss of consciousness. After a coughing spell (duration about 10 s), we always observed a sinus pause and similar syncope. Because the sinus pause and syncope were observed several times in an hour, a temporary pacemaker was inserted, which resulted in complete remission of the repeated syncope attacks. We diagnosed the patient with cough syncope and investigated its cause. Gastrofiberscopy revealed laryngopharyngeal edema, esophageal ulcers, severe esophagitis, and acute gastric mucosal lesions (AGML) (Fig. 2a—c). Based on these findings, we concluded that the cough syncope was caused by laryngopharyngitis. He abstained from food, and was treated with lansoprazole 30 mg/day (Takeda Pharmaceutical Co., Osaka, Japan), which ameliorated the repeated bouts of coughing and eliminated the sinus pause. On day 7 of lansoprazole treatment, the temporary pacemaker was removed. Subsequently, no sinus pauses were observed. Twenty days after admission, a follow-up gastrofiberscopy revealed resolution of the laryngopharyngeal edema, esophageal ulcer, and AGML (Fig. 2d—f); however, the reflux esophagitis persisted. The patient abstained from consuming sake and continued to take lansoprazole. After 6 months, Holter ECG demonstrated normal sinus rhythm and no sinus pause. The repeated bouts of coughing and syncope completely resolved.

Discussion

Cases of syncope are encountered in the emergency room on a regular basis. Because syncope can be caused by a variety of reasons, physicians are often unable to diagnose the origin of syncope in the emergency room. A previous study showed that most syncope cases were commonly attributed to disorders of the central nervous and cardiovascular systems or a vasovagal attack in the emergency room. However, the exact cause could not be determined in 34% of cases [1]. Nevertheless, the physician must accurately identify the cause for the loss of consciousness to ensure the best outcome for the patient.

In the present case, syncope was caused by repeated bouts of coughing. Previous studies reported that situational syncope, including cough syncope, accounted for only 5% of all syncope cases [2,3]. Cough syncope is generally due to increased vagal tone and decreased peripheral sympathetic tone, which causes bradycardia and hypotension.

Cough syncope results from a vasovagal reflex caused by an increase in thoracic pressure. In this case, we observed bradycardia and hypotension immediately after syncope (blood pressure 66/36 mmHg.). Neural mediated syncope (NMS) can be classified into three groups. Because he showed bradycardia and hypotension after sinus arrest, we diagnosed this case as cardioinhibitory type NMS. We investigated the efficacy of atropine for the syncope attack, and performed the head-up tilt test to confirm the vasovagal syncope.

Although it is well known that reflex-mediated syncope leads to bradycardia and an abnormal autonomic reflex response, we were unable to find any corroborating ECG findings for cough syncope among published reports. In the present case, ECG recordings (Fig. 1) obtained during the syncope attack indicated sinus arrest. Eliminating the coughing spells and implanting a permanent pacemaker are two ways to treat situational syncopes. Because permanent pacemaker implantation carries a risk of minor complications, eliminating the coughing is preferable, especially when the cause is known. Connolly et al showed that pacemaker therapy is not recommended as a first-line therapy for patients with recurrent vasovagal syncope [4]. Therefore, cough syncope should be treated by determining and treating the cause of repeated bouts of coughing and not by implanting a permanent pacemaker. In our case, a temporary pacing was used to control the acute sinus pause. Once, the cause for the coughing spells was determined, the treatment was directed at resolving the cause, which was successfully accomplished. Therefore, the patient did not need permanent pacemaker implantation.

It is important to investigate the cause of syncope to prevent unnecessary implantation of a permanent pacemaker. Several factors including bronchial asthma, bronchitis, lung cancer, postnasal drip syndrome, gastroesophagageal reflux disease (GERD), post-infectious syndromes, psychogenic disorders, and drug therapy (e.g., angiotensin-converting enzyme inhibitors) are well known as causes of cough.

GERD is a causative disease of chronic cough [5,6]. Syncope may occur during an acute coughing spell [7,8]. Based on clinical history and physical examination, our patient was suspected of

having laryngitis induced by GERD. There is only one report of cough syncope being caused by an acute coughing spell due to GERD in adulthood; in that case, the patient underwent surgical treatment [9]. However, our case was conservatively managed with fasting and lansoprazole 30 mg/day. GERD is typically manifested by chronic cough; the acute coughing spell in our case was an unusual manifestation. Laryngeal symptoms associated with GERD are often referred to as reflux laryngitis or laryngopharyngeal reflex (LPR). Farrokhi et al reported that intermittent exposure to small amounts of gastric content results in LPR or laryngitis [10]. Damage to laryngeal mucosa (e.g., laryngeal edema and erythema) by backflow of gastric contents causes cough, hoarseness, and sore throat. In this case, an alcoholic binge and vomit caused GERD and LPR observed by gastrofiberscopy. Accordingly, the coughing spell originated from GERD and LPR, which increased thoracic pressure, and caused a vasovagal reflex. Therefore, this cough syncope was successfully treated by the treatment of GERD and LPR.

Cardiologists often encounter cases of transient syncope in the emergency room. Physicians consider syncope to be of cardiac or neurological origin because of the high risk of mortality involved; however, the possibility of an extracardiac origin should also be considered. Situational syncope is especially difficult to document and therefore nearly impossible to diagnose. The causes of syncope are diverse and may manifest in disorders of different organ systems [11,12]. Hence, for conclusive diagnosis and effective treatment, patients presenting with syncope should be subjected to a careful case history and a thorough whole body examination.

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